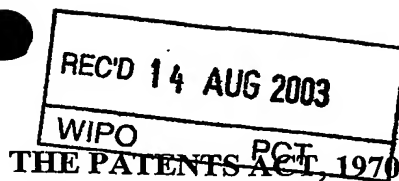


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India Limited, an Indian Company, Padi, Chennai – 600 050, Tamilnadu INDIA

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COMPLETE SPECIFICATION

(Section 10)

A BRAKING SYSTEM FOR MOTOR VEHICLES

BRAKES INDIA LIMITED
PADI
CHENNAI - 600 050
TAMIL NADU
INDIA

AN INDIAN COMPANY

THE FOLLOWING SPECIFICATION PARTICULARLY DESCRIBES AND
ASCERTAINS THE NATURE OF THE INVENTION AND THE MANNER IN WHICH
IT IS TO BE PERFORMED :

ORIGINAL
11 JUL 2002
515
IAS 2002

This invention relates to a braking system for motor vehicles.

To keep pace with increasing vehicle weights, increasing speeds and to achieve safe braking performance, brakes for motor vehicles, such as, hydraulic brakes, necessarily have to come in bigger sizes, needing correspondingly bigger wheels. Apart from the foregoing disadvantages, there is a problem of accommodating bigger size brakes on existing wheel sizes.

This invention, therefore, proposes a braking system for motor vehicles, which furnishes a greater braking force, than normally possible, to handle higher speeds, larger sizes and greater vehicle weights, without any change in the dimensions or weight associated with the normal, known braking system.

This invention also proposes a braking system which can be manufactured without any significant cost increase.

Other features and advantages of the braking system proposed herein will be discernible from the following description.

The braking system for motor vehicles, according to this invention, comprises a lined leading shoe and a lined trailing shoe for generating brake torque; a wheel cylinder assembly provided with first and second pistons corresponding to the leading and trailing shoes; a handbrake strut assembly; a lever pivotably mounted on the web of the leading shoe, with the first end of the lever resting against the first piston and its second end resting against the strut assembly, such that on applying the brakes, the first and second pistons respectively exert a thrust on the first end of the lever as well as on the web of the trailing shoe, to cause the trailing shoe to apply normal braking force on the brake drum, while the second end of the lever, on turning about the pivot, exerts a thrust on the strut assembly and, thus, against the web of the trailing shoe, to augment the normal braking force

of the trailing shoe to a predetermined extent; and the resulting reaction force of the strut assembly simultaneously acts on the second end of the lever and thus on the leading shoe, through the pivot, to also augment, to the same extent, the normal braking force of the leading shoe.

This invention will now be described in further detail with reference to the accompanying drawings which illustrate in

Fig.1 the known braking system

Fig.2 an embodiment of the proposed braking system, by way of example, and not by way of limitation, of the scope of this invention

Fig. 3 a schematic of the known braking system

and

Fig.4 a schematic of the embodiment of the proposed braking system, by way of example, and not by way of limitation, of the scope of this invention.

Referring to Fig.1 the known braking system comprises a brake drum 1, lined leading shoe 2 and

a lined trailing shoe 3 for applying the braking force.

A wheel cylinder assembly 4 is provided with first and second pistons P2 and P3 corresponding to the leading and trailing shoes. While applying the brakes, the pistons move outwardly and thrust the lined leading shoe and the lined trailing shoe towards the brake drum to cause the said shoes to come into contact with the brake drum in a braking action.

A handbrake strut assembly 5 is also comprised in the known system. On operation of the hand brake lever 6, the handbrake strut assembly actuates the shoes to apply a braking force on the brake drum.

Shoe hold down springs 7 and 8 and shoe return springs 9,10 are illustrated. During the braking action, the lined shoes are pushed against the rotating brake drum, overcoming the shoe return spring force. The drag force developed by the contact of the shoes against the drum slows down the wheel. When the pressure is removed, the shoe

return springs force the shoes back to their normal (released) position and the wheels are freed.

Referring to Fig.2 which illustrates one of various possible embodiments of the braking system proposed herein, a lever 11 is pivotably mounted at 14 on the web W2 of the leading shoe.

The first end 12 of the lever rests against the first piston P2 and its second end 13 rests against the strut assembly 5.

On applying the brakes, the first piston P2 exerts a thrust on the first end 12 of the lever 11 causing the lever to turn about its pivot 14.

The second piston P3 exerts a thrust on the web W3 on which the trailing shoe 3 is mounted. This thrust is transmitted to the trailing shoe 3 which applies the normal braking force on the brake drum.

As the lever 11 turns about its pivot 14, in the manner stated above, the second end 13 of the lever exerts a thrust on the strut assembly 5 at 15, which is transmitted to the web W3 and thus to the trailing shoe 3, to augment the normal braking force of the trailing shoe to an extent predetermined by the lever ratio that is to say, by the location of the pivot 14.

At the same time, the thrust exerted by the second end 13 of the lever 11 on the strut assembly 5, which is transmitted to the web W3, produces a reaction force, which acts on the second end 13 of the lever 11 at 15 and thus on the shoe 2, through the pivot 14, to also augment, to the same predetermined extent, the normal braking force of the leading shoe.

In short, for the same braking action, the trailing shoe 3 has two force inputs; one normal input from the piston P3 and the other input from the strut assembly. So also, for the same braking action, the leading shoe receives an

equally enhanced force input through the pivot 14 of the lever 11.

Thus the normal braking force F_1 exerted on the brake drum by each shoe, is augmented by a braking force F_2 on each shoe acting conjointly with F_1 as explicitly explained with reference to Fig.3 (known braking system) and Fig.4 (proposed braking system).

As stated above the location of the pivot 14 on the web W_2 on which the leading shoe is mounted, determines the "lever ratio" or the mechanical advantage derived from the lever. This ratio can be varied according to the requirements of a particular case by altering the location of the pivot to predetermined positions on the web W_2 .

The strut assembly 5 has a slot in which the second end of the lever is engageably accommodated, such that there is a positive movement of the strut during the movement of the lever.

The terms and expressions in this specification are of description and not of limitation, since there is no intention to exclude any equivalents of the features illustrated and described, but it is understood that various other embodiments of this invention are possible, without departing from the scope and ambit thereof.

We Claim:

1. A braking system for motor vehicles comprising a lined leading shoe and a lined trailing shoe for generating brake torque; a wheel cylinder assembly provided with first and second pistons corresponding to the leading and trailing shoes; a handbrake strut assembly; a lever pivotably mounted on the web of the leading shoe, with the first end of the lever resting against the first piston and its second end resting against the strut assembly, such that on applying the brakes, the first and second pistons respectively exert a thrust on the first end of the lever as well as on the web of the trailing shoe, to cause the trailing shoe to apply normal braking force on the brake drum, while the second end of the lever, on turning about the pivot, exerts a thrust on the strut assembly and, thus, against the web of the trailing shoe, to augment the normal braking force of the trailing shoe to a predetermined extent; and the resulting reaction force of the strut assembly simultaneously acts on

the second end of the lever and, thus, on the leading shoe, through the pivot, to also augment, to the same extent, the normal braking force of the leading shoe.

2. A braking system as claimed in Claim 1 wherein the second end of the lever is accommodated engageably in a slot provided on the strut assembly.

3. A braking system as claimed in Claim 1 or Claim 2 wherein the lever is pivotably mountable on the web of the leading shoe at predetermined points.

4. A braking system for motor vehicles substantially as herein described with reference to, and as illustrated in, Figs. 2 and 4 of the accompanying drawings.

Dated this the 9th day of July 2002

For Brakes India Limited

For BRAKES INDIA LIMITED



S. KESAVAN

Executive Director (Operations & Finance)

ABSTRACT

A BRAKING SYSTEM FOR MOTOR VEHICLES

To keep pace with the increasing vehicle weights, increasing speeds and to achieve safe braking performance, brakes for motor vehicles, such as, hydraulic brakes, necessarily have to come in bigger sizes, needing correspondingly bigger wheels. There is also a problem of accommodating bigger size brakes on existing wheel sizes.

This invention, therefore, proposes a braking system for motor vehicles, which furnishes a greater braking force, than normally possible, to handle higher speeds, larger sizes and greater vehicle weights, without any change in the dimensions or weight associated with the normal, known braking system.

This invention also proposes a braking system which can be manufactured without any significant cost increase.

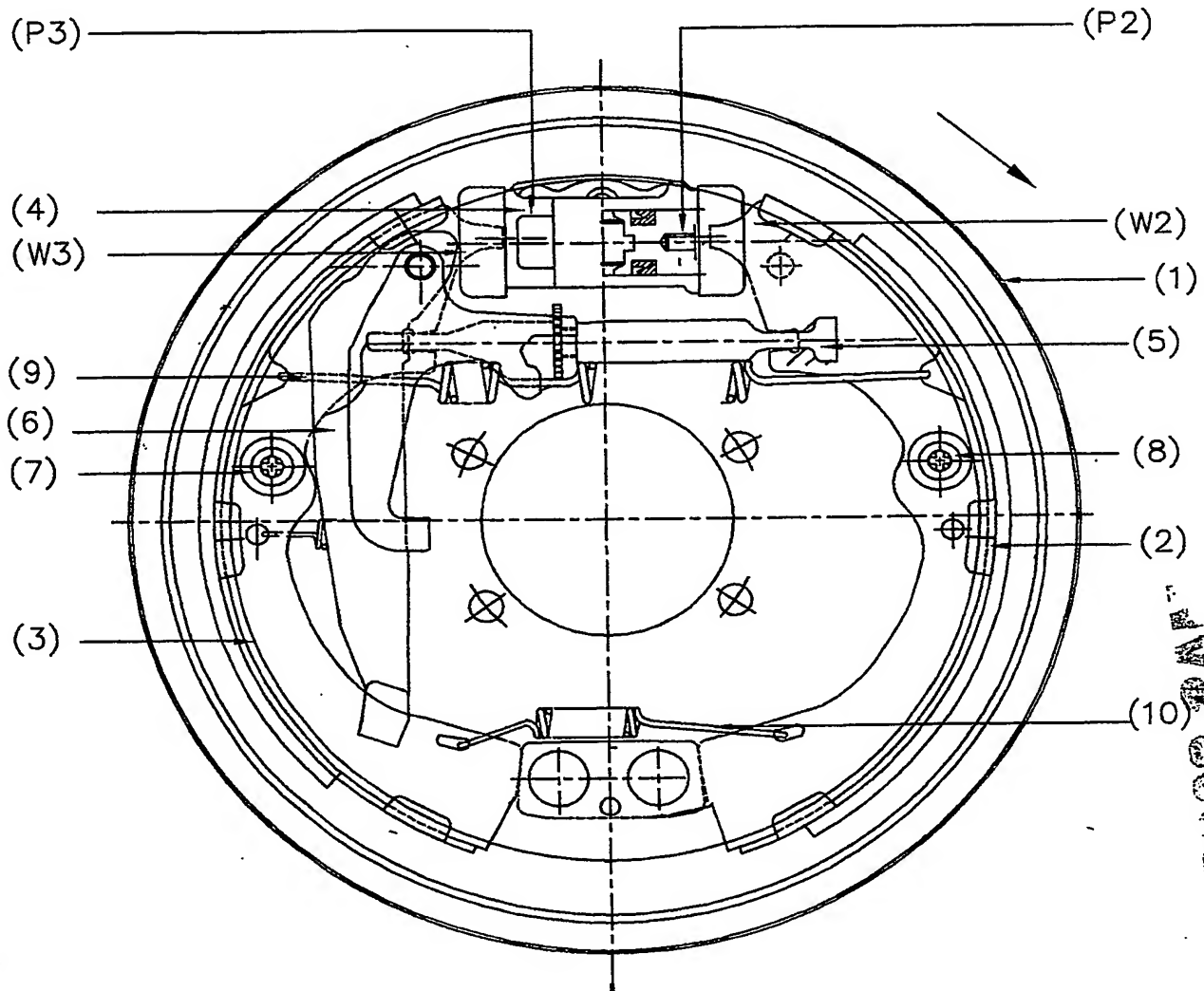
For BRAKES INDIA LIMITED


S. KESAVAN

Executive Director (Operations & Finance)

Brakes India Limited
Application No.:

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For BRAKES INDIA LIMITED Figure: 1

S. K. KUMAR
General Manager (Technical) & Research
Applicants

Brakes India Limited
Application No.:

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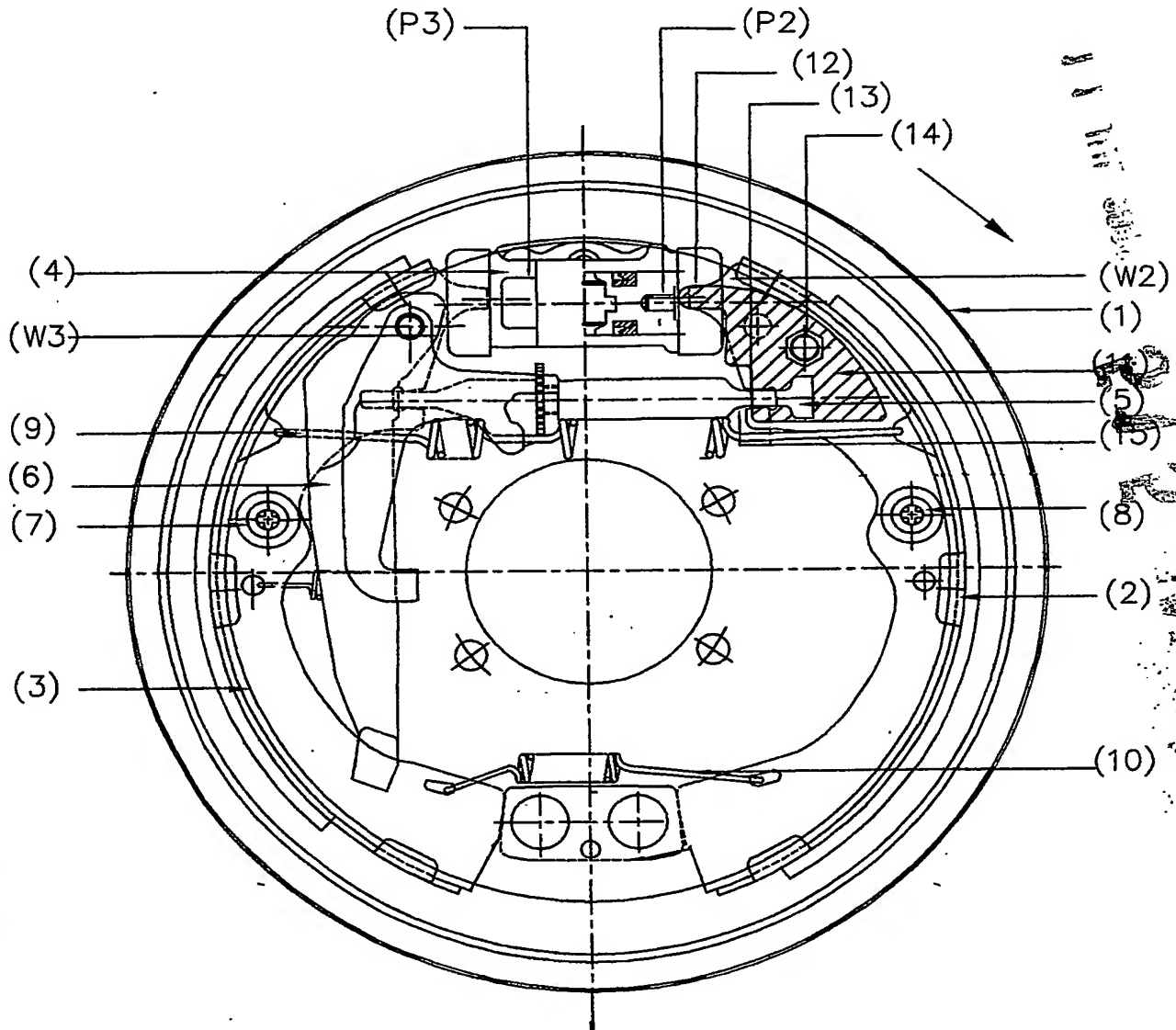


Figure: 2

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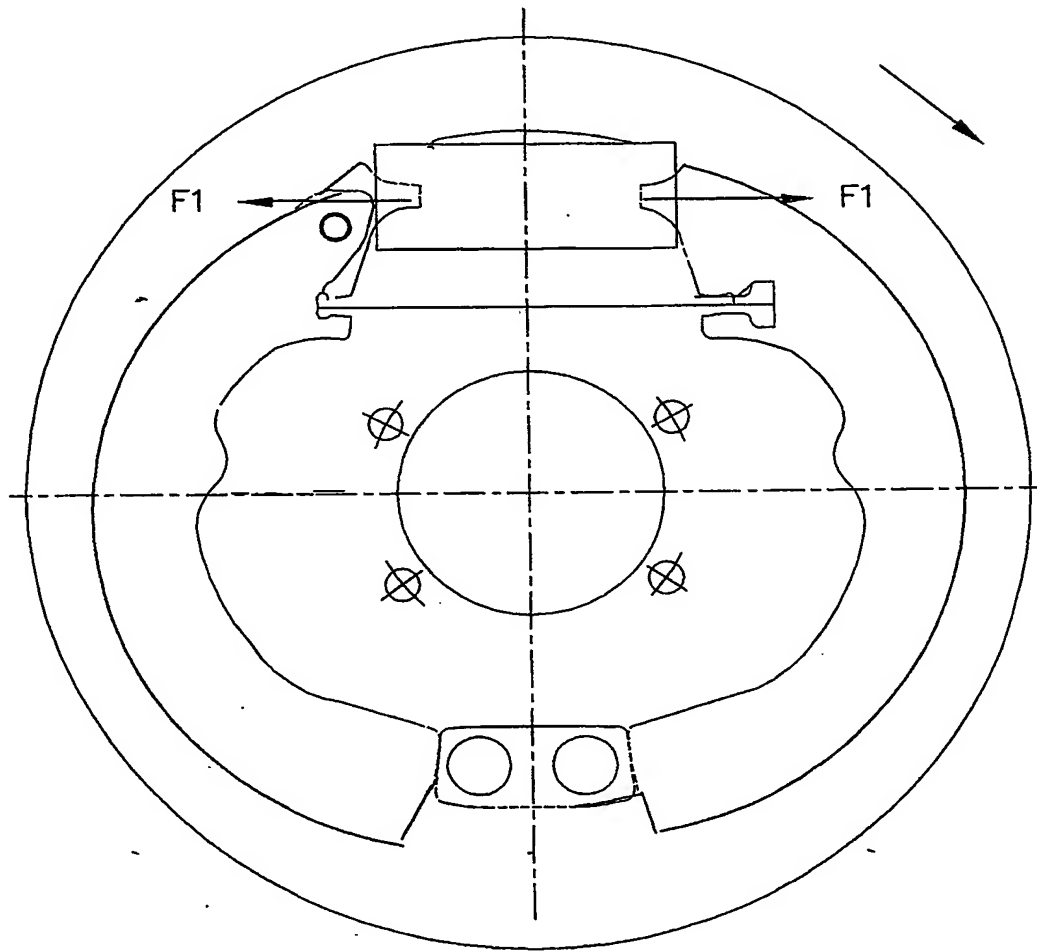


Figure: 3

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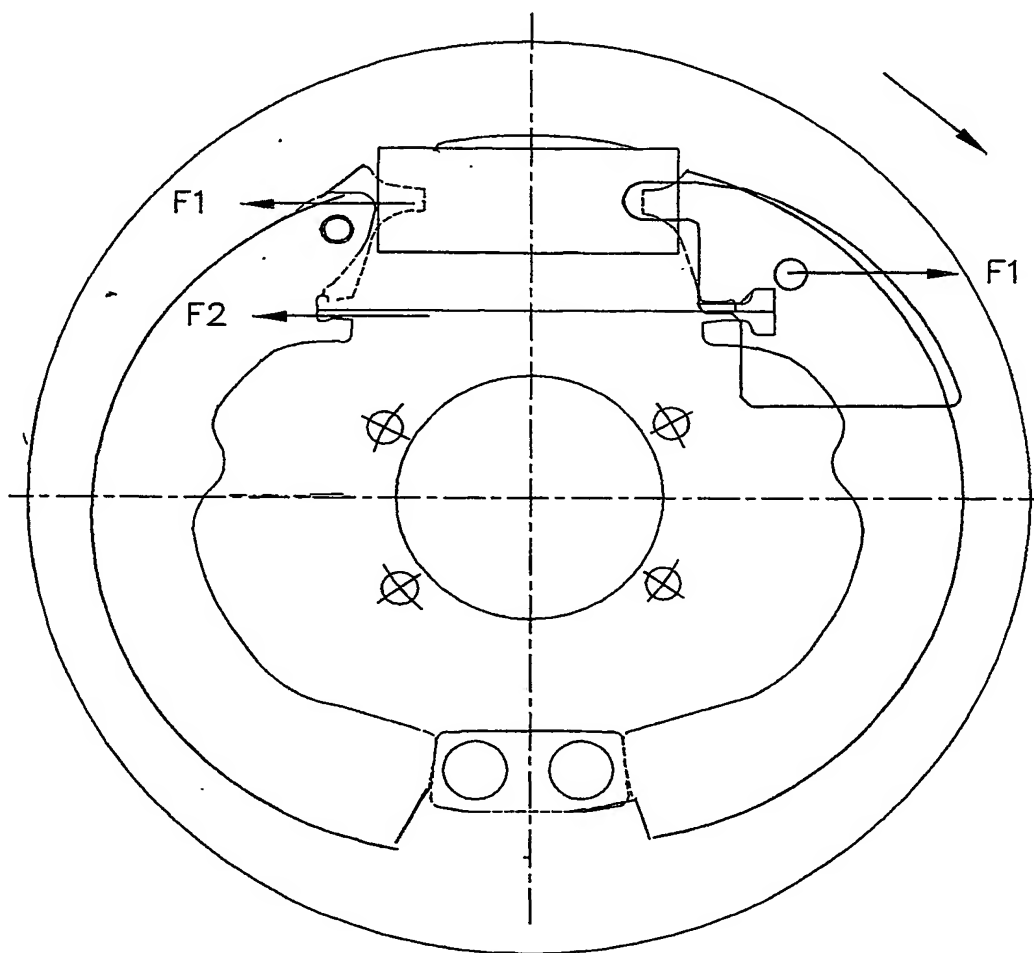


Figure: 4

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